

REMARKS

Applicants initially note the Supplemental Amendment filed November 19, 2009. As this Supplemental Amendment was filed after the mailing date of the Office Action mailed November 16, 2009, and has not been entered, the present amendments have been made with respect to the last-entered amendments, that is, the amendments in the Amendment filed August 13, 2009, consistent with the claims as considered by the Examiner in the Office Action mailed November 16, 2009.

By the present amendments, and relative to the claims in the Amendment filed August 13, 2009, Applicants have cancelled claims 4-6 without prejudice or disclaimer. In addition, Applicants have amended claim 8 to recite that R¹ is a linear or branched alkyl group having 4 carbon atoms, and that the organic solvent is propylene carbonate. In connection with amended claim 8, note previously considered claim 4, and Example 3 on pages 14 and 15 of Applicants' specification, together with Table 1 on page 15 thereof. Claim 11 has been amended to recite that R¹ is a linear branched alkyl group having 8 carbon atoms, and that the organic solvent is any one selected from the group consisting of 2-propanol and benzonitrile; note, for example, previously considered claim 5, and Example 2 on pages 13 and 14 of Applicants' specification, together with Table 1 on page 15 thereof. And claim 13 has been amended to recite that R¹ is a linear or branched alkyl group having 18 carbon atoms, with the organic solvent being any one selected from the group consisting of toluene, 1,1,2,2-tetrachloroethane and decalin; note, for example, previously considered claim 6, and Example 1 on pages 12 and 13 of Applicants' specification, together with Table 1 on page 15 thereof. In light of amendments to claims 8, 11 and 13, claims 15-17 have been cancelled without

prejudice or disclaimer. Moreover, a typographical error has been corrected in claim 20.

Initially, it is respectfully requested that the present amendments be entered, notwithstanding the Finality of the Office Action mailed November 16, 2009. In this regard, noting the cancelling of claims 4-6, as well as amendments to claims 8, 11 and 13 to be consistent respectively with Examples 3, 2 and 1, with cancelling of claims 15-17, it is respectfully submitted that the present amendments materially limit issues remaining in the above-identified application. Furthermore, noting previously considered claims 4-6 and emphasizing arguments previously made in connection with the above-identified application, and Examples 1-3 of the above-identified application referred to previously, it is respectfully submitted that the present amendments do not raise any new issues, including any issue of new matter. Noting additional arguments by the Examiner in the Office Action mailed November 16, 2009, including the contention by the Examiner in the paragraph bridging pages 6 and 7 of the Office Action mailed November 16, 2009, it is respectfully submitted that the present amendments are clearly timely.

In view of the foregoing, it is respectfully submitted that Applicants have made the necessary showing under 37 CFR 1.116(b); and that, accordingly, entry of the present amendments is proper, notwithstanding Finality of the Office Action mailed November 16, 2009.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed November 16, 2009, that is, the teachings of the U.S. Patents to Garner, No. 5,688,440, and to Merrill, No. 5,377,760; Japanese Patent Document No. 2003-

064346 (Kyodo); and the articles by Fan, et al., "A Urea-Incorporated Receptor for Aromatic Carboxylate Anion Recognition", in Journal of Supramolecular Chemistry 2 (2002), 247-254; and by Ruelle, et al., "Nonlinear Dependence of the Solubility of Water in Hydrocarbons on the Molar Volume of the Hydrocarbon", in Journal of Solution Chemistry, Vol. 25, No. 7 (1996), pp. 657-665, under the provisions of 35 USC 102 and 35 USC 103.

It is respectfully submitted that these references as applied by the Examiner would neither have disclosed nor would have suggested such an organic gel as in the present claims, of a triphenylmethane derivative of the structure of the specified formula, and wherein R¹ of the specified formula is a linear or branched alkyl group having 4 carbon atoms, and the organic solvent is propylene carbonate (see claim 8); or having 8 carbon atoms and wherein the organic solvent is 2-propanol or benzonitrile (see claim 11); or having 8 carbon atoms and wherein the organic solvent is selected from the group consisting of toluene, 1,1,2,2-tetrachloroethane and decalin (see claim 13); in particular, wherein the triphenylmethane derivative is swelled by the organic solvent (see claims 21-23).

Further, it is respectfully submitted that the teachings of these applied references would have neither disclosed nor would have suggested such an organic fiber as in the present claims, produced from the organic gel as defined in claims 8, 11 and 13, and wherein the organic fiber has a diameter of 500 nm or less (note, respectively, claims 9, 12 and 14); in particular, wherein such diameter is 100 nm or less (note, respectively, claims 24-26).

In addition, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such a process for producing the organic gel as in the present claims, including, after heating a

solution comprising the triphenylmethane derivative and the organic solvent, the resultant solution is allowed to stand at room temperature. Note claims 18-20.

The present claims are directed to organic gels and organic fibers containing specific triphenylmethane derivatives and specific organic solvents, and processes of forming the organic gels.

It has been desired to provide organic gels containing, as a constituent thereof, an organic solvent having a boiling point higher than that of water, since such organic gels can be used in applications in which hydrogels (gels utilizing water as a solvent) are inapplicable, as described in the paragraph bridging pages 1 and 2 of Applicants' specification.

Organic gels are generally more difficult to produce as compared to hydrogels, and various previously proposed organic gels have required relatively complex procedures for forming such gels, and/or the obtained gels have problems such as discoloration and insufficient gelling performance, or the procedures for forming such gels cause corrosion of equipment used. Note item [0003] on page 2 of Applicants' specification.

Against this background, and as a result of intensive and extensive researches by the present inventors, for finding an organic gel and organic gelling agent exhibiting a high gelling performance capable of readily gelling an organic solvent without the need of adding a secondary component, the present inventors have come up with the present invention. Specifically, Applicants have found specific triphenylmethane derivatives containing an urea bond therein, that exhibit excellent properties as a gelling agent when used with specific organic solvents, to form a gel and the gel can be used in readily producing an organic fiber having a length of several tens nanometers. Thus, Applicants have found specific

triphenylmethane derivatives, which, together with specific organic solvents, can be used as a gelling agent with the specific organic solvents in forming organic gels and organic fibers.

Note that the triphenylmethane derivatives utilized in forming organic gels according to the present invention are capable of gelling various organic solvents, depending on R¹ of the derivative. That is, when R¹ is a linear or branched alkyl group having 4 carbon atoms, a high gelling performance capable of gelling propylene carbonate (high polar solvent) is achieved. When R¹ is a linear or branched alkyl group having 8 carbon atoms, the triphenylmethane derivatives are capable of gelling 2-propanol and benzonitrile (polar solvents); and when R¹ is a linear or branched alkyl group having 18 carbon atoms, the compounds exhibit a high gelling performance capable of gelling toluene, 1,1,2,2-tetrachloroethane and decalin (hydrophobic solvents). That is, agents of the present invention are capable of gelling various solvents by varying the kinds of side chains in these compounds.

Note, in particular, the paragraph bridging pages 6 and 7 of Applicants' specification.

The various triphenylmethane derivatives used in forming organic gels according to the present invention can exhibit a capability of gelling an organic solvent even when used in a small amount, notwithstanding that the derivatives are low-molecular weight compounds. The resultant organic gels are useful as materials usable under a high-temperature condition, as described in the first full paragraph on page 18 of Applicants' specification. In addition, an organic nanofiber can be produced from the derivatives by a very simple process, and such nanofiber can be applied to wiring materials for electronic devices such as metallic nano wires produced by using the organic nanofiber as a template, among other uses, as described in the second paragraph on page 18 of Applicants' specification.

Attention is respectfully directed to Examples 1-3 on pages 12-15 of Applicants' specification, together with Table 1 on page 15 thereof. Note that Table 1 shows that toluene, 1,1,2,2-tetrachloroethane and decalin can be used as organic solvents for the compound of formula (7) on page 13 of Applicants' specification as gelling agent, while 2-propanol, benzonitrile and propylene carbonate cannot be; that 2-propanol and benzonitrile can be used as the organic solvent in gelling the compound of formula (8) as on page 14 of Applicants' specification, while toluene, 1,1,2,2-tetrachloroethane, decalin and propylene carbonate cannot be used as such organic solvent; and that while propylene carbonate can be used as the gelling agent for the compound of formula (9) on page 15 of Applicants' specification, the other five listed organic materials in Table 1 cannot be used as organic solvents in gelling such compound having the formula (9). That is, as can be seen in Table 1, Applicants have unexpectedly found specific organic solvents which can be used in gelling specific compounds. It is respectfully submitted that the unexpectedly better results achieved, as seen in Table 1, provides a basis for a conclusion of unobviousness of the presently claimed subject matter. This evidence must be considered in determining patentability of the presently claimed subject matter. See In re DeBlauwe, 222 USPQ 191 (CAFC 1984).

In Item 6, on page 7 of the Office Action mailed November 16, 2009, the Examiner contends that it would have been obvious to have selected from known organic solvents which would have included the claimed solvents. However, it is emphasized that Table 1 establishes that not all organic solvents can be used together with the specific triphenylmethane derivative as respectively in claims 8, 11 and 13, but only specific organic solvents can be used. In view thereof, it is respectfully submitted that, contrary to the contention by the Examiner, the selection

of organic solvent appropriate in connection with the respective triphenylmethane derivatives would have neither been disclosed nor would have been suggested by the teachings of the applied references, discussed infra, and that the unexpectedly better results achieved provides a basis for a conclusion of unobviousness of the presently claimed subject matter.

Fan discloses a neutral urea incorporated anion receptor 1 with a tripodal pseudocavity, synthesized in good yield. The article reports on the binding properties of the receptor 1 with large terephthalate and trimesylate anions using ¹H NMR and luminescence titration methods. Note the first full paragraph in the right-hand column on page 247 of this article. Note receptor 1 at the top of page 248 of this article. Note also the paragraph bridging the left- and right-hand columns on page 249, describing binding affinity of the receptor 1. Note also the Conclusions in the left-hand column on page 253 of this article.

It is respectfully submitted that Fan, et al. discloses that the substituents on "N" are an alkyl group having 6 carbon atoms. It is respectfully submitted that the teachings of this reference do not disclose, nor would have suggested, the triphenylmethane derivative included in the organic gels of the present claims, particularly R¹; and/or the specific organic solvent used together therewith, to provide the organic gel. Again, it is emphasized that in the present claims 8, 11 and 13, R¹ respectively is a linear branched alkyl group having 4 carbon atoms, 8 carbon atoms and 18 carbon atoms, and is used together with the specific organic solvents in claims 8, 11 and 13; and it is respectfully submitted that Fan, et al. would have neither disclosed nor would have suggested such triphenylmethane derivative, or organic solvent to be used therewith, and advantages achieved thereby.

Ruelle, et al. discloses solubility of water in 50 hydrocarbon solvents at 20°C, estimated by means of a solubility equation derived from the thermodynamics of mobile order in H-bonded liquids. Thus, this article reports on predictions of solubility of water in 50 saturated and unsaturated hydrocarbons, and compares theoretical values to experimental values. Note the Abstract of this article; see also the first paragraph on page 659 thereof. Note also Table 1 on pages 661 and 662 of this article, showing predicted and experimental solubilities; and the paragraph bridging pages 663 and 664, and the sole full paragraph on page 664, of this article, describing that it is the mixing entropy that rules water solubility dependence on the solvent molar volume in hydrocarbons, with the order of magnitude of the solubility of water in hydrocarbons being determined by the enthalpic contribution related to the breaking of the net of hydrogen bonds in water.

Initially, it is respectfully submitted that one of ordinary skill in the art concerned with in Fan, et al., would not have looked to the teachings of Ruelle, et al. In connection therewith, it is emphasized that Ruelle, et al. discloses solubility of water in various hydrocarbon solvents; and it is respectfully submitted that one of ordinary skill in the art concerned with in Fan, et al., directed to binding properties of the receptor 1 and binding efficiencies of receptors 1 and 2, would not have looked to the solubility of water in hydrocarbons as described in Ruelle, et al.

In any event, even assuming, arguendo, that the teachings of Fan, et al. and of Ruelle, et al. were properly combinable, such combined teachings would have neither disclosed nor would have suggested the specific triphenylmethane derivatives included in claims 8, 11 and 13, respectively, having R¹ of 4, 8 and 18 carbon atoms, respectively, much less the specific organic solvent used with each of the specific triphenylmethane derivatives, and advantages thereof in providing an

organic gel, and advantages in use of these derivatives as a gelling agent in organic gels.

Noting that the additional teachings of Garner and of Merrill have been used in connection with previously considered claims 15-17, it is respectfully submitted that the additional teachings of these references, even together with the teachings of Fan, et al. and of Ruelle, et al., would have neither disclosed nor would have suggested the presently claimed subject matter.

Garner discloses a method for gelling an organic liquid comprising dissolving an effective amount of an aryl cyclohexanol gelling agent in an organic liquid, and cooling the resultant mixture to form a gel. This patent goes on to describe that heating may be necessary to facilitate dissolution of the gelling agent. Note column 1, lines 59-67 of this patent. As to what is meant by aryl cyclohexanol gelling agent, see column 2, lines 1-3 of this patent. Note also column 2, lines 11-15 and 28-35 of this patent document, and column 3, lines 36-44, describing various gelling agents.

Merrill discloses a gel of the type useful in improving the conformance of formations encountered in the drilling and production of hydrocarbons from subterranean wells, relating to gels which are capable of blocking or plugging relatively large openings in permeable formations. This patent discloses that an opening in a subterranean formation is plugged by providing a gelation solution comprised of a water soluble crosslinkable polymer and a crosslinking agent, introducing reinforcing fibers into the gelation solution, injecting the fiber-containing solution into the opening to be plugged and crosslinking the gelation solution substantially to completion to form a fiber-reinforced crosslinked gel in the opening. See column 2, lines 39-47. Note also the last paragraph in column 2; and column 3,

lines 10-17, of this patent. Note also column 4, lines 14-18, further describing the reinforcing fibers incorporated in the gel.

Again noting the report of Fan, et al. is directed to the above described binding properties, while Garner is directed to organic gelation agents and Merrill is directed to fiber-reinforced gels (not fibers made of the gel), it is respectfully submitted that one of ordinary skill in the art concerned with in Fan, et al., or Fan, et al. and Ruelle, et al., would not have looked to the teachings of Garner or Merrill, absent hindsight use of Applicants' disclosure, which hindsight use is improper under the guidelines of 35 USC 103.

In any event, even assuming, arguendo, that the teachings of Fan, et al., Ruelle, et al., Garner and Merrill were properly combinable, such combined teachings would have neither disclosed nor would have suggested the specific triphenylmethane derivative as in the present claims, with R¹ respectively having the specific number of carbon atoms as in claims 8, 11 and 13, or the combination thereof together with the specific organic solvent as in the present claims, and advantages thereof. In particular, the combined teachings of Fan, et al., Ruelle, et al., Merrill and Garner would have neither disclosed nor would have suggested selection of the specific organic solvents for each of the specific triphenylmethane derivatives as in claims 8, 11 and 13, respectively, and unexpectedly better results achieved thereby.

Furthermore, even assuming, arguendo, that the teachings of Fan, et al., Ruelle, et al., Garner and Merrill were properly combinable, such combined teachings would have neither disclosed nor would have suggested the organic fiber as in the present claims, produced from the organic gel. That is, it is emphasized

that according to the present invention the organic fiber is produced from the organic gel, not that there are reinforcing fibers in the organic gel as in Merrill.

The contention by the Examiner in the second paragraph on page 6 of the Office Action mailed November 16, 2009, that “it is well known in the art that the properties of a given fiber can be enhanced or [reinforced] by the addition of a gel”, and it would have been obvious at the time of the invention by a person of ordinary skill in the art to strengthen an organic fiber by adding an organic gel . . . that would have [included] various diameters including the claimed ranges”, the Examiner referring to Merrill, is noted. However, Merrill discloses fibers of material such as glass to reinforce the gel (the gel itself is not a fiber). In contrast, it is emphasized that according to the present invention, the fiber itself is formed of (produced from) the organic gel. It is respectfully submitted that a disclosure of fiber-reinforced gels would have neither disclosed nor would have suggested the presently claimed organic fiber, produced from the organic gel, much less such fiber having a diameter as in claims 9, 12, 14 and 24-26.

Kyodo discloses gelling agents for organic liquids, comprising diurea compounds as seen in the formulas (1) and (2) in paragraph [0005] of this document. Note that R₁ and R₂ of the diurea compound are each a linear or branched alkyl group each expressed by the formula C_mH_{2m+1} and C_nH_{2n+1}, with m and n each being an integer of 1-40, m+n=25-40 in the formula (1) and m+n=12-40 in the formula (2).

Fan, et al. and Garner (applied by the Examiner with Kyodo in connection with claims 8, 11 and 13), and, in addition, Merrill (applied by the Examiner with Kyodo in connection with claims 9, 12, 14 and 18-26) have been previously discussed.

Again emphasizing the disclosure of Fan, et al. reporting binding properties of the receptor 1 with large terephthalate and trimesylate anions, while Kyodo discloses

gelling agents, it is respectfully submitted that one of ordinary skill in the art concerned with in Kyodo would not have looked to the teachings of Fan, et al. Absent Applicants' disclosure, there would have been no reason for combining the teachings of Kyodo and Fan, et al.

In any event, emphasizing that Kyodo discloses diphenylmethane urea derivatives, not triphenylmethane derivatives, it is respectfully submitted that there would have been no disclosure, or suggestion, of triphenylmethane derivatives, much less those with specific R¹ as in the present claims, as a substitute for the gelling agent in Kyodo.

As discussed in connection with the previous rejection using the teachings of Garner (with respect to claims 8, 11 and 13), or of both Garner and Merrill (with respect to claims 9, 12, 14 and 18-26), it is respectfully submitted that the teachings of these references as applied by the Examiner, even together with the teachings of Kyodo and Fan, et al., would have neither disclosed nor would have suggested the presently claimed invention, including the organic gel and organic fiber produced from such organic gel, including use of the specific triphenylmethane derivative with R¹ respectively as in claims 8, 11 and 13, especially together with the specific organic solvent as in these respective claims, and advantages thereof, especially together with features of dependent claims as discussed previously, including the organic fiber and diameter thereof, and advantages thereof.

The contention by the Examiner that the difference in the length of the alkyl group attached to the urea linkage "is an obvious variant that one of ordinary skill in the art at the time of the invention could achieve through routine synthetic methods" is respectfully traversed, especially in view of the evidence of record. That is, it is respectfully submitted that Table 1 shows that unexpected differences arise with

differences in length of the alkyl group attached to the urea linkage, in compounds used as gelling agents with different organic solvents; and, in fact, that various organic solvents cannot be used with compounds having different R¹ from each other. It is respectfully submitted that this evidence in Table 1 rebuts the position by the Examiner that the difference in length of the alkyl group "is an obvious variant".

As can be seen from Table 1, it would not have been obvious to a person of ordinary skill in the art at the time of the present invention, to have selected the specific triphenylmethane derivative and specific solvent as in the present claims, with the advantageous results achieved thereby. It is respectfully submitted that such selection provides a basis for patentability of the presently claimed subject matter.

In view of the foregoing comments and amendments, entry of the present amendments, and reconsideration and allowance of all claims being considered on the merits in the above-identified application, are respectfully requested.

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Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By William I. Solomon
William I. Solomon
Registration No. 28,565

WIS/ksh
1300 17th Street N., Suite 1800
Arlington, Virginia 22209
Tel: 703-312-6600
Fax: 703-312-6666